

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of the claims in the application:

Listing of Claims:

1 – 76 (Cancelled)

77. (Original) Packet switch system comprising:

- a packet switch engine;
- a downstream re-multiplexing engine, coupled to said packet switch engine and to a plurality of downstream transmit units; and
- a plurality of media-access controllers coupled to said downstream re-multiplexing engine, said packet switch engine and to upstream channels,
said media-access controllers provide packets received from said upstream channels either to said downstream re-multiplexing engine or to said packet switch engine, according to packet content type and packet original destination.

78. (Original) The packet switch system, according to claim 77, further comprising an upstream switch coupled between said media-access controllers and said upstream channels,

said upstream switch dynamically directing packets from selected ones of said upstream channels to selected ones of said media-access controllers.

79. (Original) The packet switch system, according to claim 77, wherein said packet switch engine is further coupled to a data network.

80. (Original) The packet switch system, according to claim 79, wherein said data network is an IP network.

81. (Original) The packet switch system, according to claim 77, wherein said downstream transmit units are further coupled to a broadband network including in-band channels and out-of-band channels,
wherein said packet switch engine is further coupled to said out-of-band channels via a data link.

82. (Original) The packet switch system, according to claim 81, wherein said data link comprises an IP interface.

83. (Original) The packet switch system, according to claim 77, further comprising a rate adaptation statistical multiplexor engine, coupled to said packet switch engine.

84. (Original) The packet switch system, according to claim 77, further comprising a processor, coupled to said packet switch engine.

85. (Original) The packet switch system, according to claim 83, further comprising a processor, coupled to said packet switch engine.

86. (Original) The packet switch system, according to claim 85, wherein said processor is operative to determines and controls the load balancing between competing communication elements and provides parameters there according, to said downstream re-multiplexing engine, said rate adaptation statistical multiplexor engine and said media-access controllers.

87. (Original) The packet switch system, according to claim 85, wherein said processor is operative to determine transmit priority to each session transmitted through said downstream re-multiplexing engine, detect over all transmit load and control the transmitting order and quality of said sessions.

88. (Cancelled)

89. (Currently Amended) ~~The method according to claim 88, further comprising the step of~~ Method for directing a packet in a communication switching system, comprising the steps of:

rate adapted multiplexing said packet, over data-over-broadband network transmission, when said packet is a part of a media session over data-over-broadband network transmission, authorized for rate adaptation multiplexing;

rate adapted multiplexing said packet, over media-over-broadband network transmission, when said packet is a part of a media session over media-over-broadband network transmission, authorized for rate adaptation multiplexing; and multiplexing said packet, over media-over-broadband network transmission, when said packet is a part of a media session over media-over-broadband network transmission, not authorized for rate adaptation multiplexing.

90. (Original) The method according to claim 89, further comprising the step of encapsulating said packet and re-multiplexing said encapsulated packet for further transmission, when said packet is directed to a non data-over-broadband network transmission end unit, supporting in-band channels.

91. (Original) The method according to claim 90, further comprising the step of directing said packet to an out-of-band channel, when said packet is directed to a non data-over-broadband network transmission end unit, not supporting in-band channels.

92. (Original) The method according to claim 91, further comprising the step of directing said packet to a selected media-access controller and further re-multiplexing said packet for further transmission, when said packet is directed to a cable modem.

93. (Original) The method according to claim 92, further comprising the steps of:

- determining a packet destination according to session management determination or external network resources;

- directing said packet to said packet destination when said packet destination is determined; and

- discarding said packet when said packet destination can not be determined.

94. (Currently Amended) ~~The method according to claim 88, further comprising the steps of:~~ Method for directing a packet in a communication switching system, comprising the steps of:

- rate adapted multiplexing said packet, over data-over-broadband network transmission, when said packet is a part of a media session over data-over-broadband network transmission, authorized for rate adaptation multiplexing;

- rate adapted multiplexing said packet, over media-over-broadband network transmission, when said packet is a part of a media session over media-over-broadband network transmission, authorized for rate adaptation multiplexing

- assigning priority to each session associated with a received packet;

- detecting transmit system load;

- controlling said session transmit order and quality according to said detected transmit system load.

95. (Currently Amended) ~~The method according to claim 88, further comprising the steps of:~~ Method for directing a packet in a communication switching system, comprising the steps of:

rate adapted multiplexing said packet, over data-over-broadband network transmission, when said packet is a part of a media session over data-over-broadband network transmission, authorized for rate adaptation multiplexing;

rate adapted multiplexing said packet, over media-over-broadband network transmission, when said packet is a part of a media session over media-over-broadband network transmission, authorized for rate adaptation multiplexing

assigning priority to each session associated with a received packet;
detecting transmit system load;
controlling said session transmit order and quality according to said detected transmit system load.

96. (Currently Amended) The method according to claim 88 89, wherein said media-over-broadband network transmission included MPEG transport.

97. (Currently Amended) ~~The method according to claim 88~~ Method for directing a packet in a communication switching system, comprising the steps of:

rate adapted multiplexing said packet, over data-over-broadband network transmission, when said packet is a part of a media session over data-over-broadband network transmission, authorized for rate adaptation multiplexing;

rate adapted multiplexing said packet, over media-over-broadband network transmission, when said packet is a part of a media session over media-over-broadband network transmission, authorized for rate adaptation multiplexing, wherein said data-over-broadband network transmission includes data-over-cable (DOCSIS) transmission.